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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------------------|------------------------|
| 10/649,040 | 08/27/2003 | Curtis E. Graber | CUSTO-02004 | 5139 |
| 28270 7590 02/22/2008 O'MALLEY AND FIRESTONE 919 SOUTH HARRISON STREET SUITE 210 FORT WAYNE, IN 46802 | | | EXAMINER KURR, JASON RICHARD | |
| | | | ART UNIT 2615 | PAPER NUMBER |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/649,040 | GRABER, CURTIS E. | |
| | Examiner | Art Unit | |
| | Jason R. Kurr | 2615 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 November 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16 and 17 is/are allowed.
- 6) ☒ Claim(s) 1,2 and 10-15 is/are rejected.
- 7) ☒ Claim(s) 3-4 and 6-9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152..

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 10-12, 14 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Danley (US 4,845,759).

With respect to claim 1, Danley discloses a loudspeaker comprising: an enclosure including a folded horn having a base end (fig.6 “end where throat #46 meets drivers #40,42,44”) and a mouth (fig.4 #48); a summing throat forming a portion of the folded horn including the base end, (fig.6 “portion where throats #46 meet”) the summing throat increasing in cross sectional area in a direction of acoustic energy propagating; a plurality of acoustic transducers housed in the enclosure (fig.6 #40,42,44); and a plurality of radiating ports (fig.6 #46), each radiating port providing for coupling sound energy from each respective acoustic transducer into the summing throat, each radiating port being disposed at a discrete, acoustically spaced location along the summing throat with successive locations of the radiating ports occurring at points along the summing throat exhibiting increasing cross sectional area to initiate and synchronously reinforce an acoustic pressure wave building from the base end toward the mouth (fig.2, col.2 ln.59-66).

With respect to claim 2, Danley discloses a loudspeaker as set forth in claim 1, further comprising: a source of an acoustic range signal (fig.3 "AMP"); and transducer drive signal processing circuitry (fig.6 #60) having an individual channel for each of the audio transducers, the individual channels each being coupled to receive the acoustic range signal and each channel including means (fig.3 #32) for setting a relative phase angle for the acoustic range signal in a channel as a function of the acoustic spacing of the radiating outlets to build an acoustic pressure wave in a cascade in the summing throat toward the mouth (col.2 ln.67-68, col.3 ln.1-15).

With respect to claim 10, Danley discloses an apparatus comprising: a plurality of high pressure chambers (fig.6 #46) substantially the same volume (fig.6); a plurality of extended acoustic ports, each extended acoustic port (fig.4 #54) having a constant cross-sectional area between input and radiating ends (fig.5), and each providing a outlet constricting the outflow of air from the high pressure chambers (fig.6 #46) at the input end; a horn having a summing section (fig.6 "portion where throats #46 meet") and a mouth (fig.4 #48), the summing section comprising a base end (fig.6 "end where throat #46 meets drivers #40,42,44") of the horn furthest removed from the mouth and a waveguide (fig.6 #46) extending from the base end toward the mouth which exhibits an increasing cross sectional area along its length from the base end toward the mouth; the extended acoustic ports being connected into the summing section at acoustically spaced locations with one extended acoustic port connecting to the summing section at the base end of the horn and subsequent extended acoustic ports connecting to the summing section along a waveguide defining surface, each extended acoustic port

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terminating on the waveguide defining surface at successive locations of increasing cross sectional area of the waveguide and at sequentially closer locations to the mouth (fig.2) to support a cascade buildup of an acoustic pressure wave propagating from the base end of the summing section toward the mouth of the horn; and a plurality of identical acoustic pressure wave generators (fig.6 #40,42,44), one of each being coupled to radiate into each high pressure chamber.

With respect to claim 11, Danley discloses the apparatus as claimed in claim 10, further comprising: means (fig.3 #32) for coordinating operation of the acoustic pressure wave generators so that the pressure waves from the radiating ends of the acoustic ports reinforce one another (col.2 ln.67-68, col.3 ln.1-15).

With respect to claim 12, Danley discloses the apparatus as claimed in claim 11, wherein the acoustic pressure wave generators are substantially identical, low frequency transducers and are aligned side by side (fig.6).

With respect to claim 14, Danley discloses the apparatus as claimed in claim 11, the means for coordinating further comprising drive circuitry for the acoustic pressure wave generators including delay means (fig.3 #32) for synchronizing merger of the pressure waves upon their meeting in the summing section (col.1 ln.42-48).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Danley (US 4,845,759) in view of Ohta (US 2001/0016045 A1).

With respect to claim 15, Danley discloses the apparatus as claimed in claim 14, however does not disclose expressly wherein the drive circuitry includes a pass band filter associated with each of the acoustic pressure wave generators and a dynamic phase adjustment element for each of the acoustic pressure wave generators.

Ohta discloses a system for correcting a sound field in an audio system wherein a plurality of channels of a transducer drive processing circuitry (fig.2 #2) connected to respective speakers each comprise: a band pass filter (fig.2 "BPF 2-5") receiving an acoustic range signal (fig.2 #3) and producing a filtered signal therefrom, and a dynamic phase adjustment element (fig.2 "Delay Circuit") receiving the filtered signal and adjusting the phase of the signal as a function of frequency to produce a drive signal for an acoustic pressure wave generator (pg.4 [0055]).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the sound field correcting system of Ohta in the invention of Danley. The output of the band pass filter of Ohta would have supplied a filtered signal for the delay means of Danley, still allowing for adjustment in the dispersion pattern of the disclosed horn. Providing the additional phase adjustment element of Ohta would have allowed for the invention of Danley to compensate for various acoustic environments.

The motivation for using the sound field correcting features of Ohta in the invention of Danley would have been to allow the system to correct sound field anomalies resulting from imperfect acoustic environments, more specifically frequency and delay characteristics. This would provide a listener within the environment a more realistic reproduced sound, absent of distortions resulted from the acoustic environment.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Danley (US 4,845,759) "Danley1", in view of Danley et al (US 6,411,718 B1) "Danley2".

With respect to claim 13, Danley1 discloses the apparatus as claimed in claim 11 wherein the acoustic transducers are low frequency devices, however does not disclose expressly wherein the acoustic transducers are housed in sealed back chambers.

Danley2 discloses an apparatus wherein the acoustic transducers (fig.2C #50,52,46,48) are housed in sealed back chambers (fig.2C "not labeled").

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the sealed back chambers of Danley2 on the transducers of Danley1.

The motivation for doing so would have been to protect the drivers of the transducers from being damaged from external foreign objects.

Allowable Subject Matter

Claims 16-17 are allowed.

Claims 3-4 and 6-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments filed November 19, 2007 have been fully considered but they are not persuasive.

With respect to claims 1 and 10 the Applicant argues that Danley does not teach wherein the speakers are located at successive points of increasing cross-sectional area along the waveguide. The Examiner would like to note that the present claims disclose, "each radiating port being disposed at a discrete, acoustically spaced location along the summing throat with successive locations of the radiating ports occurring at points along the summing throat exhibiting increasing cross sectional area". This merely limits the ports as being located at successive locations (Danley: fig.6 #46) along a summing throat that has an increasing cross sectional area, as clearly shown in figure 6 of Danley. The claim does not disclose that these successive locations are along a side of the summing throat extending from the base to the mouth.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Heinz (US 5,526,456) discloses a multiple driver single horn loud speaker.

Howze (US 4,344,504) discloses a directional loudspeaker.

Rocha (US 6,118,883) discloses a system for controlling low frequency directivity patterns.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason R. Kurr whose telephone number is (571) 272-0552. The examiner can normally be reached on M-F 10:00am to 6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571) 273-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JK

JK



VIVIAN CHIN
SUPERVISORY PATENT EXAMINER